

Opportunities for Applying Customer Order Decoupling Point Approach in Bulgarian SMEs from Furniture Sector

Abstract. In recent years, many worldwide famous companies, mostly through their own customer Internet platforms, launch increasingly close relationship with the customers in the process of innovation, product development and value creation. In terms of the company operations system point of view, the focus is on the "intermediate" stage – the manufacturing process. One of the main tools for supporting and operationalizing customer's participation in the manufacturing process is the well-known Customer Order Decoupling Point – CODP. It is both a concept and an approach that offers a beneficial combination of Economies-of-Scale in the production process with a considerable diversity in product mix – as specified by the customer through his/her order.

The main question arising for the company here is how far it is worth to allow the customer penetrate into the process of shaping the end product (with regard to technological, economic, competitive etc. considerations). As for the customer, the question is how to encourage him/her to be more active and entrepreneurial during this process of mutually beneficial cooperation.

In the present paper, a survey about the opportunities for applying this approach in the conditions of Bulgarian furniture SMEs is presented, where such ideas have rich prospects.

Keywords: Customer Order Decoupling Point, Mass Customization, Co-Creation, Furniture Sector, SMEs.

1. Induction

CODP stands for “Customer Order Decoupling Point”. Often, for the same meaning, many authors use different terms and abbreviations, like “Customization Point” (Ramachandran et al., 2002) “Delay of Product Differentiation” (Gupta & Benjaafar, 2004), “Point of Postponement” (Feitzinger & Lee, 1997), Order Penetration Point (Olhager, 2003; Panayotova & Andreev, 2012) etc.

CODP is a widely used tool in the process of applying Mass Customization and Co-Creation. It is a popular approach to increase the diversity of end items, while using the advantages of the standardization/modularization due to an increased repetitiveness of operations devoted to manufacturing of components and/or subassemblies. CODP defines the stage in the manufacturing value chain, where a particular product is linked to a specific customer order. In fact, it marks the place (the operation, the process phase etc.) where the customer’s intervention occurs, in order to define the final mode and appearance of the end item (no matter product or service), according to his/her wishes and preferences.

In general, the idea of CODP is presented in the Figure 1 (Andreev, 2009). On the top of the figure, a simplified view is used to depict the sequence of operations and supplier-client relationships. It is represented by the subsequent steps of the whole supply chain – from the suppliers of raw materials downstream to the end client – the customer. According to the position of CODP, the customer is “allowed to penetrate” through the operational process, by the act of his/her order, using different options to choose at the CODP itself. Thus, the customer could define one or more particular subassemblies/components of the end item to be used in the final assembly, or the components of any particular subassembly, or a given combination of both, as well as to define certain component parts, and so on – upstream to the beginning of the process.

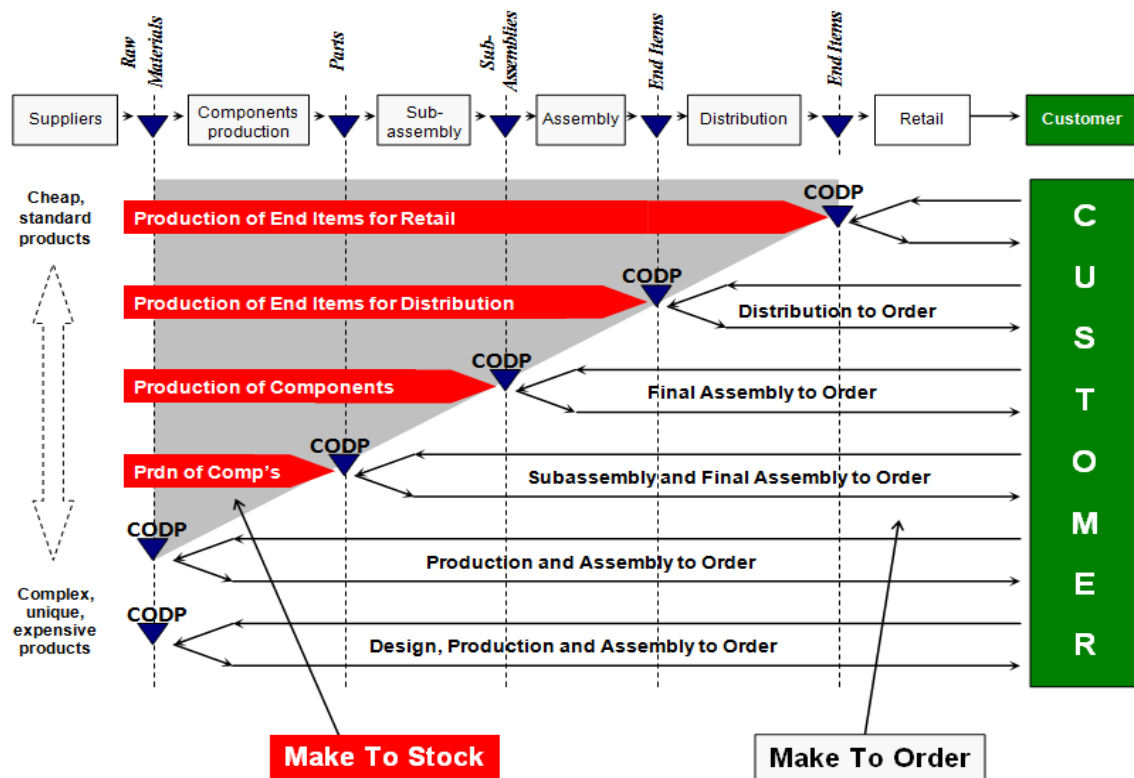


Figure 1. Variety of possibilities to position Customer Order Decoupling Point (Andreev, 2009)

In fact, each of the end items built this way is a different customized product/service assembled according to the choice/preferences of the particular customer. Moreover, the customer could be involved not only in choosing component options, but in performing some of the operations as well, likewise the case of home assembled furniture etc.

Present publication is the result of a PhD research project № 131ПД0029-15 at Scientific & Research Division of Technical University of Sofia entitled “A Study of Main Factors Influencing the Customer in Deciding on Positioning of Customer Order Decoupling Point (CODP)”.

As a subject of this study, the companies from the furniture industry have been selected. This choice is motivated by the fact that the furniture industry is one of the industries which involve a wide variety of opportunities for customer participation in the end product formation.

The purpose of this publication is to find out whether Bulgarian SMEs from furniture sector successfully apply the philosophy of CODP while performing their activities, as well as to outline the main problems accompanying this endeavor. These results could serve as a basis for developing a model to determine the appropriate location of CODP in order to increase the efficiency of the company's production system.

2. Aspects of Issues Associated with the CODP Concept Implementation

At present, the issues related to the *customer integration* in the process of value creation are a subject of extensive discussions in the scientific community. According to Piller, Moeslein & Stotko (2004) this is the most characteristic feature of the Strategy for Mass Customization and actually its successful implementation depends largely on the effectiveness of such integration. Although researchers comment this aspect of interaction between manufacturer and customer in different ways, in fact it is governed by the location of the CODP itself.

In many publications (Olhager, 2003; Rudberg & Winker, 2004; Winker & Rudberg, 2005; Velev, Andreev & Panayotova, 2011 etc.), different emphasis is placed during decision making on CODP positioning, e. g. – how far to allow customers (by means of CODP) to enter the process of final shape forming of the end item/product. What can be considered as a weakness of current approaches is *the lack of feedback from the customer* or largely ignoring their position about the issue under consideration. The authors of present publication are of the opinion that this way an important aspect of the problem is missing, whereat businesses will not be able to position themselves correctly to customer intentions to participate. This discrepancy in the positions of two interacting parties can lead to customer frustration, and as a result – to lost sales.

Furthermore, companies must provide the *necessary conditions* so that they are able to meet requirements of product customization. In this regard, a major role is given to the *modularity* of (1) products, and (2) processes.

Modularity, or possibility for end-item differentiation, is pre-determined by its structure (architecture). According to Ulrich & Eppinger (1995), product architecture can be defined as *the way in which the functional elements of a product are arranged into physical units and the way in which these units interact*. In this sense, they indicate that the modularity of the product architecture is determined by the degree of physical and functional independence of components that compose it. The more modular the product architecture – the greater the opportunities for product customization, i.e. CODP can be shifted/positioned upstream the process (to the left on Figure 1).

With regard to the processes, the modularity is expressed by the possibility of employing multiple different routings for each end item producing. This means that for different end products and/or components various interchangeable routings should be available to be employed. Thus the use of *virtual cellular manufacturing systems* could prove to be appropriate. Moreover, these systems can largely retain their effectiveness, regardless of structural and technological changes that may occur due to the product as a subject of market demand (Gerwin & Kolodny, 1992; Wemmerlov & Hyer, 1989; Greene & Sandowski, 1984; Dakov & Lefterova, 1999). Also some process modules could be subject of outsourcing if the company is unable to provide them, or if it would be unprofitable (Bineva & Dimitrov, 2007).

An accurate assessment of the *supplier's integration* in the process of value creation is also necessary (Dimitrov, 2008; 2012), resulting not only from a strategic point of view, but from the inventory management policy as well. This important point should not be ignored as it can substantially contribute to the size of end product *delivery time*.

3. Profile of SMEs Studied

The survey covered enterprises operating in Bulgarian furniture industry and was conducted by the method of polling. As respondents, senior level executives were selected, as well as professionals involved in organizing and managing manufacturing operations. The results obtained are interesting and indicative with regard to the extent of businesses' orientation to customers and their ability to adapt to the characteristics of contemporary dynamic market environment.

Forty two furniture enterprises have been studied, of which 18 (43%) are located in Sofia and 24 (57%) – in the country. As to their size, they are distributed as follows: small enterprises – 50%, middle enterprises – 43%, and micro enterprises – 7%. It should be noted that the majority of Bulgarian furniture enterprises falls within the range of small and medium sized ones, which is why it could be seen from Figure 2 that companies in the sample are relatively evenly distributed in both.

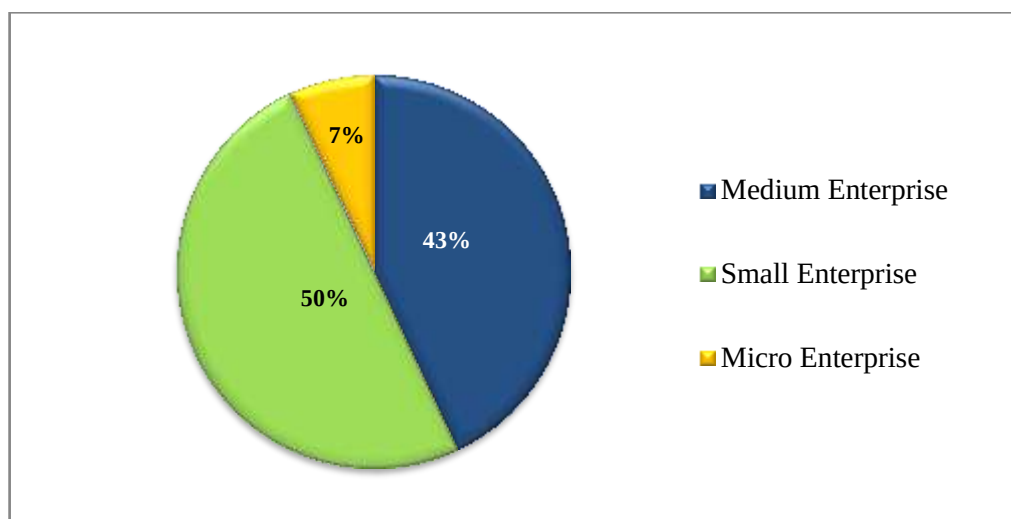


Figure 2. Size-structure of enterprises studied

The main markets, in which companies place their production, are shown on Figure 3. Concerning present trends, it is clear enough that the situation is not expected to change significantly in the near future. It became clear also from the analysis that 75% of their annual sales have been realized in the Bulgarian market and 25% – abroad. One may also note that 33% of the companies operate exclusively on the Bulgarian market. The authors express the opinion that the Bulgarian furniture enterprises have good opportunities and should more

importantly seek partnerships with foreign companies, as well as opportunities to enter new markets abroad.

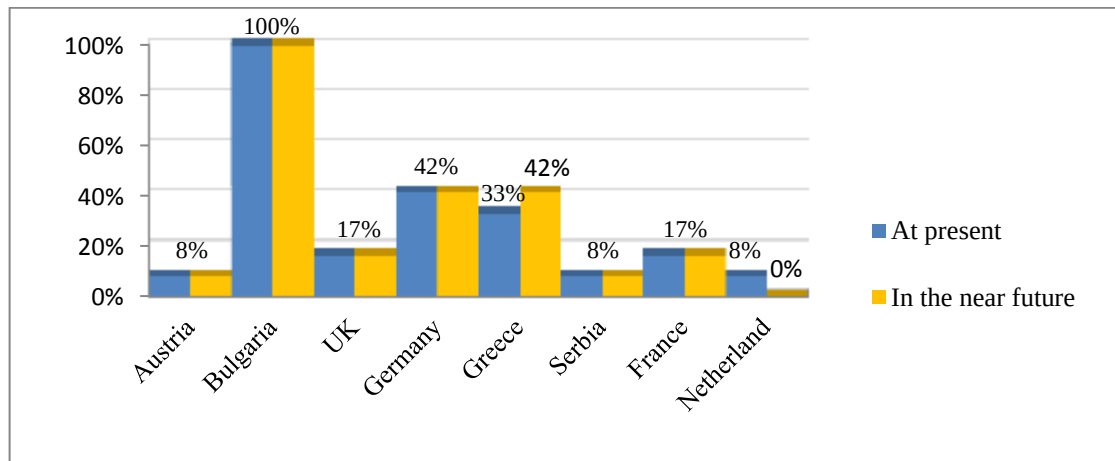


Figure 3. Bulgarian furniture SMEs' major markets

In this regard, we can say that 28 (67%) of executives surveyed determine the *combination of quality and low price* as their primary strength, through which a successful partnership with companies from Germany could be established. As for the establishment of strong local market positions, the majority of managers (92%) considered their main strength to be the *quality* of production, while a small part of all respondents (17%) relies on the *price* as the strongest advantage. It is noteworthy also that only a relatively small proportion of businesses (33%) considered their *customer orientation* as an important strength. In the light of this publication, this is not a good finding, but also it is a kind of indicator for the underestimation of this important issue by managers.

Results of the survey show also that the product mix of companies in the sample contains mainly 5 product groups (Figure 4):

- Home Furniture;
- Hotel Furniture;
- Public Buildings Furniture (schools, hospitals, etc.);
- Office Furniture;
- Interior Design and Furnishing.

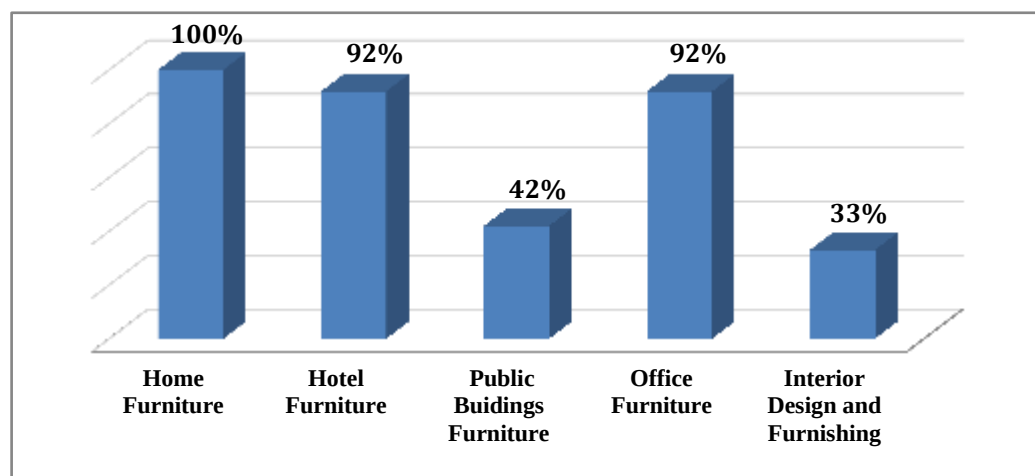


Figure 4. Main items in Companies' product mix

Each one of the presented in Figure 4 product families suggests the possibility of customers' participation in end product formation. It can also easily be noted that the lowest level of customization could be expected to be in the group of furniture for public buildings, and the greatest – in the group of interior design and furnishing. The latter, however, has the smallest share...

In terms of importance for their business strategy, the 42 companies awarded above product groups with following priorities:

- 36 respondents (83%) indicated that the product group “Home Furniture” is of highest or high priority. 11 out of them declare the same priority for “Hotel Furniture”, 7 – for “Office Furniture” and “Interior Design and Furnishing”, and 11 bet only the first product group;
- The remaining 6 respondents (17%) are distributed as follows: 3 show that, among the product groups with the highest or high priority for them, are “Home Furniture”, “Public Buildings Furniture” and “Office Furniture”; and the rest 3 give the same importance to only two of the groups – “Hotel Furniture” and “Interior Design and Furnishing”.

4. Analysis of the Degree of Customer Willingness to Participate During Product Value Creation

According to the approach and the extent of our study, in the present publication customer feedback has been investigated through the enterprises' vision and their impressions of customer's behavior and intention/desire to participate in the "creation" of products.

According to the respondents' opinion, in the last three years the customer's willingness for participation has risen – the weighted average of the assessment for the last year (see Figure 5) is 4.92 on a 7-degree scale (1 = very low, 7 = very high).

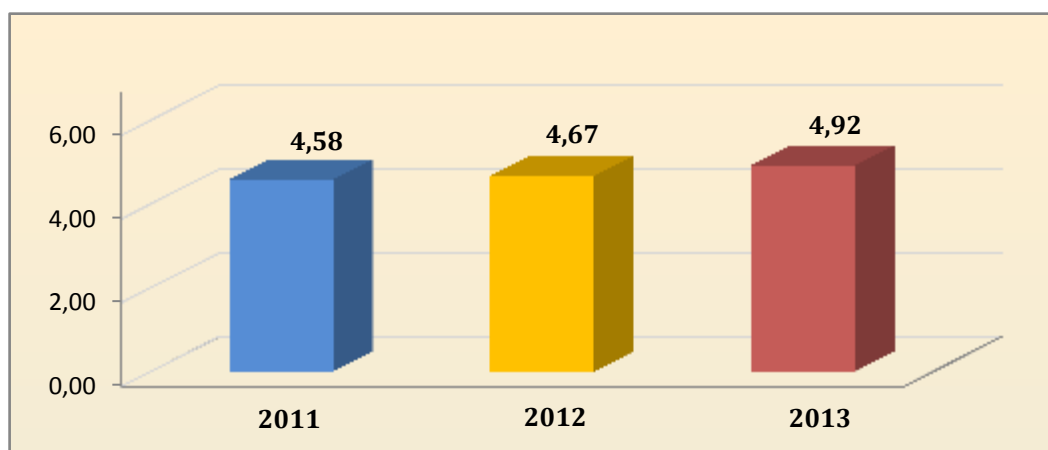


Figure 5. Weighted average of managers' assessment of customer willingness to participate in final shape forming of end items/products

In the course of study three main types of customers emerged (see Figure 6):

- *Active Customers* – being completely engaged in the process of creating their own product is typical for them. They are considerably informed and often go to the manufacturer with a “ready to execute” solution/project to be realized;
- *Moderately-active Customers* – they only insist on choosing product details which give a specific semblance and the character of their product, and

- *Inactive Customers* – the ones, who only broadly define the parameters of the product desired and leave the manufacturer to decide on the details and specifics.

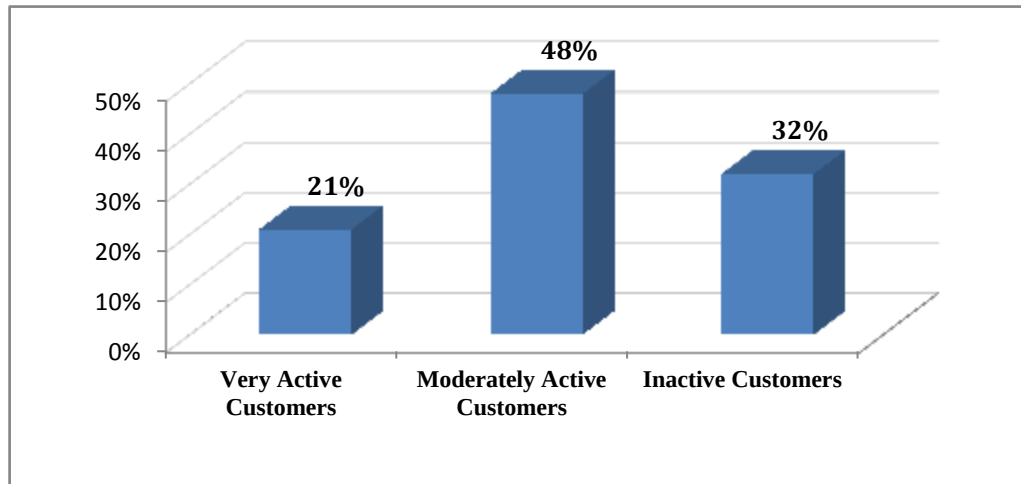


Figure 6. Average share of three types of customers

According to the opinion of 25% of executives surveyed, one of the reasons, which in some cases even leads to a decrease in the customer's activity, is related to the difficulty to make a choice among too many options available. As it can be seen from Figure 7, they have evaluated the response of customers to the large variety in the product mix rather negative. Moreover, some of them even resort to 'intentionally' decreasing options that offer customers, and this way – not confusing their choice. On the other hand, 42% of manufacturers have exactly the opposite opinion and indicated the two highest ratings – 6 and 7, and 33% – the middle score of 4.

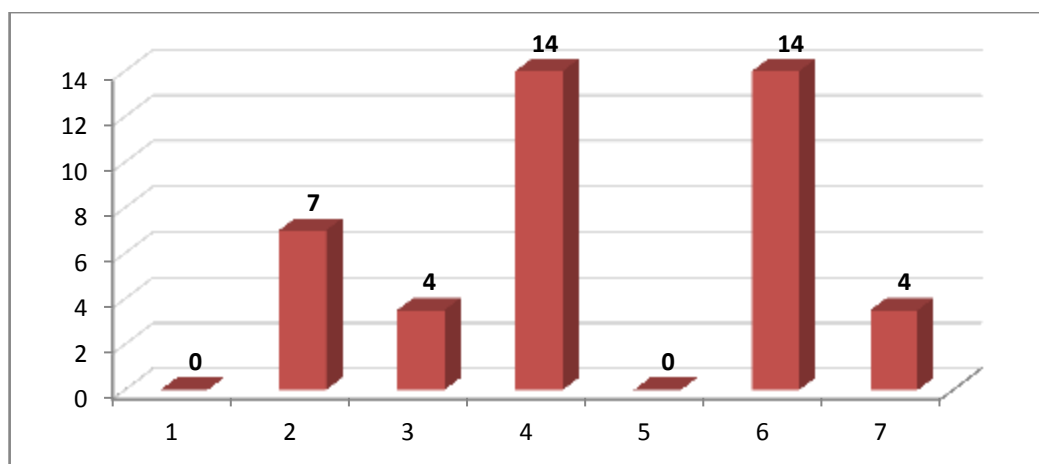


Figure 7. Assessment of customers' response when there is a wide variety in the product mix

The latter presented results confirm to some extent the previously expressed view that some managers ignore the importance of issues discussed in this publication. The main problem of modern market relations lies not that much in the field of offering a wide range of varieties of a product (certainly, this is important very much!), but it rather should correspond to the *individual needs* of customers. In this sense, the embarrassment in the customer choice can be a result of failing to meet 'their' own variant among proposed ones – the one that meets their individual requirements and expectations. This is precisely the advantage of such a new customer role in the process of interaction with the manufacturer – to jointly create a

set of product variants that consists of the correct set of options. In this regard, furniture producers need to make additional efforts to encourage customers to participate more actively in decision making process related to the creation of their own product.

5. Analysis of the Opportunities Provided by Companies for Customer Participation in the Process of Creating Value

For the last year, the enterprises surveyed have enriched the diversity of their product mix by an average of 29 new products. However, it should be kept in mind that here we are talking about variations of existing products that are not a subject of significant structural and technological changes. Respondents judged to a relatively high degree their capabilities to flexibly add new items to the product range in terms of time needed to do this (Figure 8a), as well as for the capabilities to change the productivity of the production subsystem without too much effort (Figure 8b). However, the situation with funds needed for new products launching is slightly worse (Figure 8c), indicating a relatively poor performance of companies in this direction – obviously, they are not so flexible, or it is more expensive for them to be as flexible as needed, i.e. – they are not efficient enough.

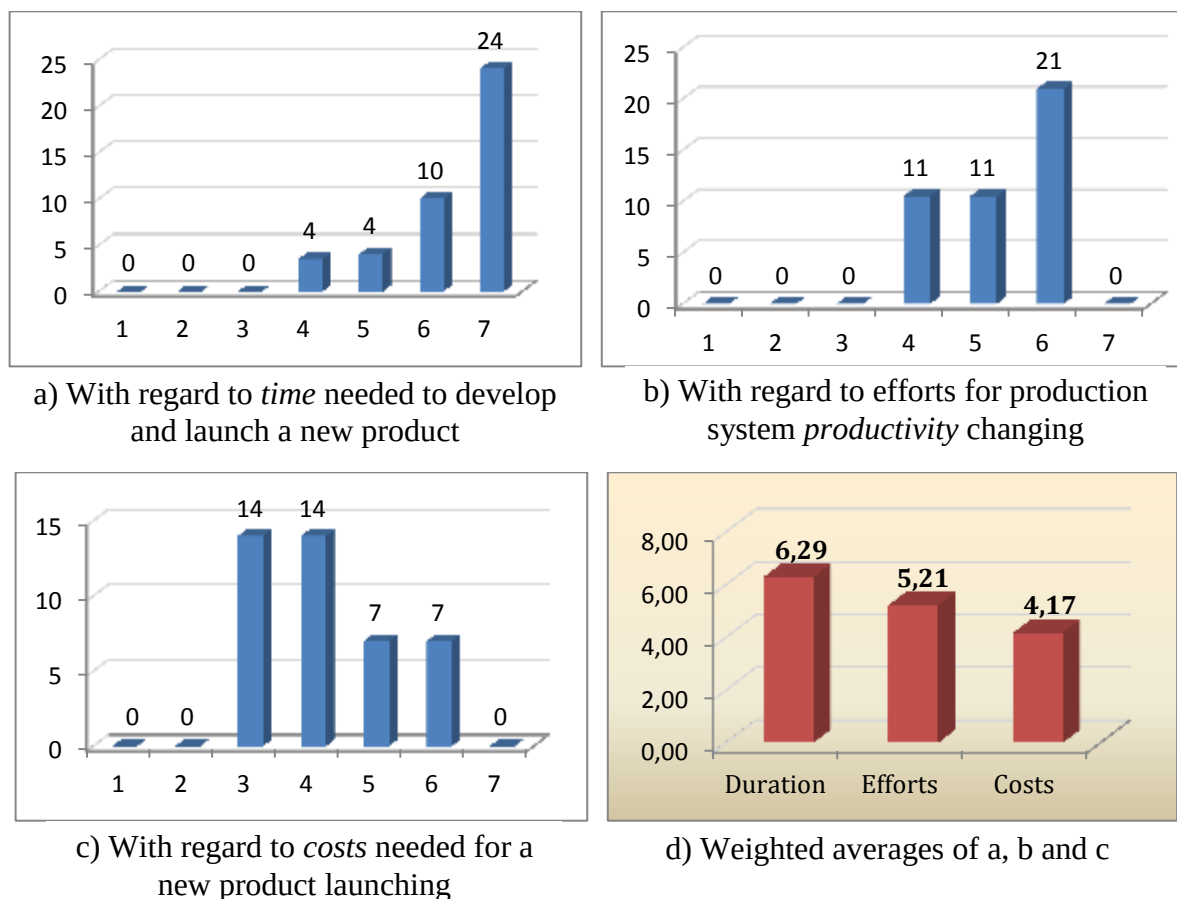


Figure 8. Assessment of capabilities of the companies to flexibly add new items to their product mix

According to their own opinion, the majority of respondents (92%) valued the opportunities they give to customers to participate in the creation and shaping of end products as relatively high (Figure 9). As above, managers' opinion is rated on a scale from 1 (very small opportunities) to 7 (very big opportunities). A relatively even distribution of opinions between assessments 5, 6 and 7 is available. 33% of companies have given the highest grade and 8% indicated a relatively small possibility of interference with the customers – 3.

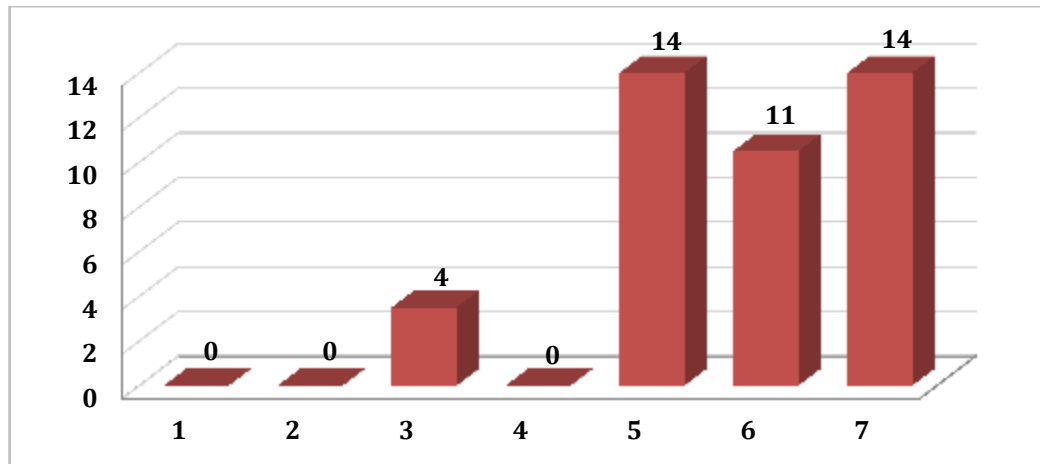


Figure 9. Opportunities given to customers to participate in the forming of end item/product

At first glance, distribution of the products according to the degree of customization presented in Figure 10 (e.g. CODP location along the logistics/manufacturing chain) could be considered as a confirmation of their own assessment mentioned above (Figure 9). It is obvious that the share of both “Make-to-Order” and “Engineer-to-Order” groups is the biggest one, and consequently the share of sales from end item inventories (“Make-to-Stock”) is the smallest one.

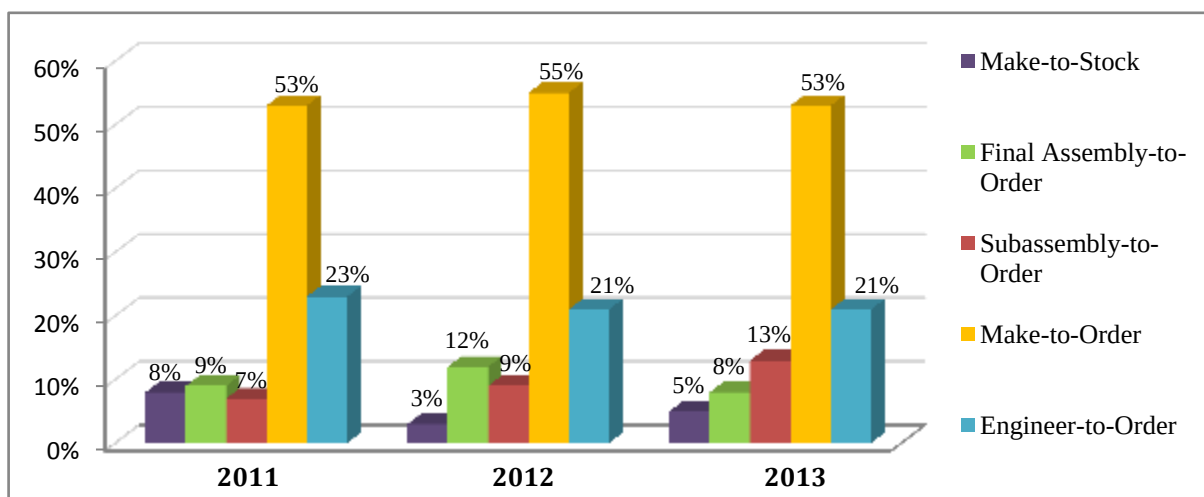


Figure 10. Degree of customization of products sold during recent three years

Regardless of the picture “presented by managers”, it figured out in the course of survey that the most frequent way of involving customers was to “roughly” decide on the *basic parameters* of the final product selected (size, number of components, color etc.), while, in fact, to a large extent the *detailed design* of the product itself was always a decision of the producer. It must also be emphasized that, according to a not so small part of managers, exactly this way of thinking fits into their vision of **customer participation**! This, unfortunately, to a large extent contradicts the philosophy of CODP and the requirements for availability of various opportunities for, and degrees of integration with the customers CODP suggests (Andreev, 2009; Panayotova & Andreev, 2012).

However, it sounds encouraging that 50% of respondents indicated that their customers are not looking anymore for standard products and this is one of the main factors, which they say favors (and even more – requires) customer involvement in the process of

final product creating. This statement testifies to their adequate knowledge of the market situation and demand trends.

Furthermore, the majority of managers shared the opinion that there are 5 major factors that limit the opportunities for customer complicity:

- I. *Design peculiarities* that customers are not competent to decide on, and therefore their interference could degrade the quality of the final product;
- II. *Technological features*;
- III. *Delivery time*;
- IV. *Price* – here the limitations are expressed in the inability to provide customers with the desired product at the expected price. This most often requires that they make a compromise about the pre-set requirements (e.g. simplification of design, use of cheaper materials etc.);
- V. *Lack of customers' initiative*.

As seen on Figure 11, most managers believe that factors I, II, IV and V are the main restrictions on allowing customers to penetrate the process of adding value. Also, first three, and as a consequence – IV, at most are variables (and therefore – weaknesses) of manufacturing systems themselves. So companies will have to make efforts to improve their capacity and reduce the significance of these restrictive factors (which in many cases is connected again with investments).

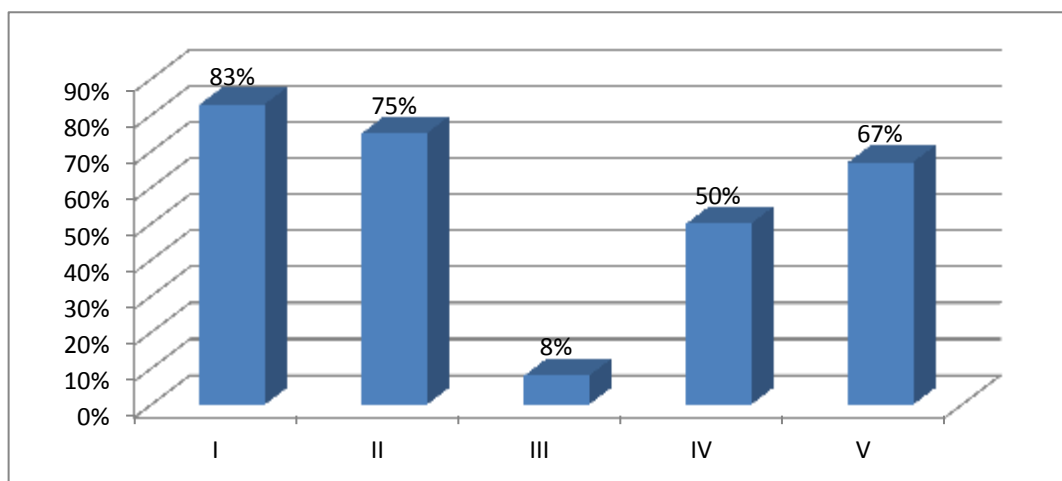


Figure 11. Factors, constraining the opportunities for customer intervention

For example, with regard to the design peculiarities of products, none of the companies in the survey has made any effort to optimize their product structure, so as to create favorable conditions for the customer participation. They still have not even created somewhat favorable conditions to achieve bigger product variety without unnecessary high efforts and costs – for example to establish so cold “Design for Manufacturing”, “Design for Assembly”, “Design for Mass Customization” etc.

Next, despite the small percentage of respondents among managers pointing delivery time as a constraint for the customer co-participation, during the study it became clear that this is the most common cause (19%) leading to customer dissatisfaction and in 4,29% of cases, it has led customers to abandon their order. One reason for this lies in the lack of efficient *system for inventory management* – the majority of respondents indicated that they purchased the necessary materials only after the customer's order was placed!? This further lengthens the time customers have to wait for their product. It is advisable that an appropriate

level of inventory is kept (Service Level) for the most widely used raw-materials and component parts / sub-assemblies.

6. Conclusion and Directions for Further Work

The survey, presented here, tried to indicate some of the problems, SMEs in the Bulgarian Furniture sector are facing when trying to apply the approach of Customer Order Decoupling Point, as well as to put the question of how far it is worth to diversify their product mix with the proper set of product variety options with regard to technological, economic, competitive etc. considerations. Concerning customers to be more entrepreneurial during this process, main factors for their dissatisfaction and canceled orders were identified and conclusions have been made in order to give companies from furniture sector some recommendations to cope with the constraints and consequently apply modern operations management approaches and techniques.

An important issue has appeared to show that there is a gap between visions of customers and producers (managers) about the nature and degree of customer participation in the process of value creation – manufacturers are still of the opinion that customers are allowed only to choose the overall characteristics of the product, and are not allowed to penetrate deeper into the process by choosing subassemblies, component parts etc. However, the global market shows that the benefits of engaging customers in product design and development, manufacturing process, after-sales maintenance and other related activities are increasingly apparent, as well as they are becoming a big competitive advantage for the companies.

The conclusions of this publication are directed in creating a methodology for defining the “optimal” position of CODP for a closer and mutually beneficial cooperation with the customers.

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